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Improved delivery of plasmid DNA complexes with polycation into human cells in the presence of block copolymers of ethylene oxide and propylene oxide

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Abstract

The work is aimed at the study of the effect of novel block copolymers of ethylene oxide and propylene oxide on the delivery of plasmid DNA and its complexes with cationic polymers into human cells. Tri-functional amphiphilic block copolymers on the basis of glycerol (LaprolsTM), polyethyleneimine (25 kDa) and commercial transfection reagent TurboFectTM were tested as delivery systems. TurboFect was found to form more compact and positively charged polyplexes with plasmid DNA (pEGFP-N2) and provided higher expression of GFP in HEK 293 cells compared to polyethyleneimine. Laprols weakly interacted with plasmid DNA and did not improve its intracellular delivery. However they markedly promoted cell transfection by DNA-polyethyleneimine complexes. Results show that Laprols exhibit mild cytotoxicity and produce the interest for gene therapeutics delivery into cells.

Keywords

Block copolymers of ethylene oxide and propylene oxide, Gene therapy, Plasmid DNA, Polymeric carriers, Polyplexes